ATTACHMENT J.4.75

HEPA AIR FILTRATION DEVICE REQUIREMENTS

ENGINEERING TECHNICAL SPECIFICATION

SECTION 15860

HEPA AIR FILTRATION DEVICE REQUIREMENTS

REVISION 1

Effective 12/03/97

Originator (Subject Expert): Dexter G. Lunsford 12-03-97
Dexter G. Lunsford — Date

APPROVED BY: Ronald C. Worsley 12-3-97
Ronald C. Worsley — Date
Facility/Technical Engineering

ORIGINAL

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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SECTION 15860

RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
4/9/97	0	Change Construction specification to Engineering specification.
12/3/97	1	Upgrade specification to existing requirements by Dan Griffin, Randy Palmer and Lorie Miller. Change was a result of DCN 1742-006, dated 10/30/97. Issued by Dexter Lunsford.

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HEPA AIR FILTRATION DEVICE REQUIREMENTS

PART I GENERAL

1.01 Air filtration devices purchased, leased and/or used at the FEMP will meet the minimum requirements of this specification.

A. This document provides the specification required for packaged portable 1,000/2,000 cfm air cleaning devices (AFD) at the FEMP. This AFD shall be designed to have a housing that accommodates a minimum of two stages. The stages are a prefilter and a high efficiency particulate air (HEPA) filter.

B. The air cleaning devices are required to be used in asbestos abatement, lead abatement, and/or low level radiological contamination .

1.02 RELATED SECTIONS

A. Specification Section 11010 also applies to this section

1.03 REFERENCE DRAWING

A. As required for installation at the FEMP.

1.04 REFERENCES, CODES, AND STANDARDS

AMCO 210 Laboratory Method for Testing Fans

ASHRAE 52-76 Method of Testing AFDs used in General Ventilation for Removing Particulate Matter

RM - 0012 Quality Assurance Program Description

A.	AG-1A-1996	Code on Nuclear Air & Gas Treatment, Article FC
B.	NFPA 70-90	National Electric Code
C.	UL 900 Units	Standard for Safety/Test Performance of Air Filter
D.	UL 586	Standard for Safety/HEPA Filter Units.
E.	ERDA 76-21	Section 8.3.1, In place Testing of HEPA Filters

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1.05 SYSTEM DESCRIPTION

See Part 2

1.06 SUBMITTALS

As required by Procurement documents:

A. Submit for Compliance Review

1. Shop Drawings: Shop Drawings shall include assembly
2. Fan or AFD air flow performance curves.
3. Motor ratings for 100% continuous operation duty cycle.
4. Unit power requirements including voltage and current requirements.
5. Electrical components and controls used by operator.
6. Warranty.

B. The Manufacturer shall submit:

1. Manufacturer shall certify that the supplied product meets or exceeds the requirements of this Fluor Daniel-Fernald specification. Unit (s) submitted for purchase shall pass the site Dioctyl Phthalate (DOP) test with a minimum in-place efficiency of 99.97%. Failure to pass the site DOP test shall be cause for rejection of the unit. The unit shall be shipped back to manufacturer or supplier at no cost to Fluor Daniel Fernald.
2. Documentation that their filters are designed, manufactured, and tested under a Quality Assurance program meeting all requirements of 10 CFR 830.120.
3. The manufacturer's warranty on the HEPA filter, including the maximum allowable shelf life.

C. Deviations: Exceptions or proposed changes to this specification shall be submitted to Fluor Daniel-Fernald. Each exception or proposed change shall:

1. Be submitted in writing.
2. Identify the specification and revision number.
3. Identify the criteria that cannot be met (by section and item number).
4. Summarize the reason for the exception.
5. Present a proposal for resolution

D. Submit with the Delivery:

Manufacturer shall provide with the shipment:

1. Complete installation instructions.
2. An Operations and Maintenance manual, including instructions for changing the filters, periodic cleaning, lubrication, and motor and drive assembly replacement.

3. A complete spare parts list.
4. Electrical wiring diagrams.

1.07 QUALITY ASSURANCE

A. General

1. Fan Performance Ratings: Conform to AMCA 210 and bear the AMCA Certified Rating Seal or provide a certificate of compliance.
2. All operation and testing of filter materials shall be in compliance with NFPA 70, UL 900, and UL 586 as referenced.
3. Both interior and exterior surfaces of the HEPA filter housing and fan assembly must be cleaned of weld flux, oil, grease, shop soil, and visible rust.
4. The AFD unit shall be fully warranted for a period of one year.
5. Fluor Daniel-Fernald shall reserve the right to inspect these units at the point of manufacture.
6. The filter bulkhead inside the air-handling equipment shall be flat, clean, smooth and free of defects. Gaskets and/or caulking shall not be an acceptable fix of defects with the bulkhead.

B. QUALIFICATIONS

As required by Procurement documents.

1.08 DELIVERY, STORAGE, HANDLING

As required by Procurement documents

1.09 PROJECT CONDITION

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1.10 SEQUENCING AND SCHEDULING

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1.11 WARRANTY

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1.12 MAINTENANCE

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PART II PRODUCTS

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2.01 MANUFACTURERS

A. Recommended Manufacturers

1. Abatement Co/Operatives
   5146 Duff Dr.
   Cincinnati, OH 45246
   (513) 860-3444 or (800) 352-1032

2. Aerospace America, Inc.
   Bay City, Michigan
   (517) 884-2121

3. American Air Filter, Inc.
   Cincinnati, Ohio
   (513) 825-6565

4. Metal Craft Air Filtration Inc.
   JF English Co. Inc.
   Cincinnati, OH
   (513) 771-2820

5. Ketchum & Walton Co.
   Cincinnati, OH
   (513) 489-7111

6. IONEX Research Corp.
   Colorado
   (303) 666-4400

7. NFS/RFS
   Connecticut
   (203) 434-0660

8. Power Products and Services Co. Inc.
   Forest, VA
   (804) 525-8120

9. ADVEX Corp.
   Hampton, Virginia
   (804) 865-0920

10. H.P. Thompson UTEC
Milford, OH
(513) 831-8044

11. Airflow Systems, Inc.
Dallas, TX
(214) 272-3003

12. Aercology Air Cleaning Systems
Old Saybrook, CT
(800) 826-6123

B. Recommended Air-Handling Equipment

Note: Do not order a ventilation device by Model Number only. The requirements must be stated in order to ensure that the specifications are met.

1. The following equipment has been purchased in the past for use for asbestos abatement at the FEMP site and has consistently met the requirements:

   A. HEPA-AIRE 2000, Full Feature (H2000A)
   Abatement Co/Operative

   B. Aero-Clean 2000/1000 - Model # 9103
   Aerospace America, Inc.
   Remarks: Cannot be supplied weather proof or bag-in/bag-out. Not for outdoor use. Must specify the differential pressure alarm requirement or it will not be provided.

2. The following equipment has been purchased in the past for use for nuclear applications at the FEMP site and has consistently met the requirements:

   A. AIRHOG Model HV-2000-BI/BO
   Power Products and Services Co. Inc.
   Remarks: Reliable, high flowrates at moderate pressures, can be supplied weather proof.

   B. NFS-RPS Model PFB-1600
   NFS-RPS
   Remarks: Reliable, can be supplied weather proof.

   C. CSC Model 1H1W-012-1NB-3S
   Ketchum & Walton Co.
   Remarks: Reliable, can be supplied weather proof.

3. Lead abatement equipment must be pre-approved by FDF. The following equipment may be used for lead abatement at the FEMP site:

   A. Coppus Model PFX -1500
      H.P. Thompson UTEC

   B. Airflow Systems, Inc. Model PAC 91
      Airflow Systems, Inc.

   C. Aercology Model WA-1000 EP & HT
      Aercology Air Cleaning Systems

2.02 PRODUCTS/EQUIPMENT

A. Disposable Pleated Prefilter:

1. Media:
   a. Shall be UL 900 Class I or II, with an effective open area of not less than 90 percent.
   b. The media filtering surface shall be a minimum of 17 square feet.
   c. The dust spot efficiency shall have a rated average efficiency of not less than 30 percent.
   d. The initial resistance shall not exceed 0.3 inch wg at 1,000 cfm nominal.

2. Frame:
   a. Heavy duty, rigid construction, fire retardant, moisture resistant, with diagonal support members bonded to the air entering and exit sides of each pleat. The inside periphery of the enclosing frame shall be bonded to the air filter pack.
   b. For asbestos abatement, the actual frame size shall be 24" high x 24" wide x 2" deep; tolerance + 0, -0.125" (610 mm high x 610 mm wide x 50 mm deep; +0, -3mm).
   c. For nuclear applications, a 6" to 12" pre-filter is recommended to protect the HEPA Filter with an efficiency rating of 85%.

2.03 MATERIALS

HEPA Filters:

A. Filter Construction:
   1. The 2,000 cfm HEPA filter element shall be a "nuclear grade", and the media shall meet the requirements of UL 586 and AG-1A-1996, Article FC.
   2. The holding frame shall be stainless steel.
   3. The construction of the filter and media to frame side bond shall meet the UL 586 and AG-1 standards.

4. The face gasket shall be Neoprene expanded rubber with dovetail, butterfly, or butt joints. The gasket can be on both sides but, at least, located on the sealing face of the filter.
5. The actual size shall be 24" high x 24" wide x 11.5" deep; tolerance +0, -0.125 inches (610 mm high x 610 mm wide x 292 mm deep; +0, -3 mm) and squareness shall be within ± 0.125", depth shall be 0.0625".
6. Filters shall have face guards on both open faces of the filter.
7. The HEPA filter frame shall be labeled, certifying:
   - Manufacturer's unique code Underwriter's Laboratory (UL) registration number indicating compliance with UL 586;
   - Filter efficiency based on DOP testing;
   - Resistance at the test air flow rate; and
   - Filter part number and serial number.
8. No chromium or cadmium metals and no asbestos containing materials shall be used in the construction of the filters.

B. Performance Rating:
1. The minimum certified efficiency shall be 99.97 percent when DOP tested with 0.3 micron particles at 100% and 20% rated flows.
2. The rated clean resistance shall not exceed 2.2 inch wg at 2,000 cfm.
   Note: This is an exception to AG-1, Section FC which states 1.3 inch wg at 2,000 cfm.

C. Air Filter Housing Construction:
1. General:
   The cabinet housing shall be:
   a. Reinforced and capable of handling 2,000 cfm at 10 inches wg negative pressure air flow conditions.
   b. Ruggedly constructed and made of durable materials, such as 0.080 inch aircraft aluminum, 16 gauge stainless steel, or cold rolled steel. All cold rolled steel shall be coated with manufacturer's standard rust inhibiting paint. Chromium or Cadmium metals shall not be used.
   c. Designed and constructed in a manner that does not require the air flow to change direction through the housing as it enters or exits the housing.

2. The cabinet housing shall:
   a. Have a steel filter mounting frame to allow the filters to be self supporting and easily installed and serviced from a front or side servicing arrangement.
   b. Have all joints and seams welded air tight and free from all burrs and sharp edges.

3. The exhaust ports shall provide for flexible ductwork connections. For lead abatement, an attachable hood shall be provided for each inlet flexible duct connection to allow for localized ventilation applications.

4. The air cleaning unit shall be able to pass through a 34-inch wide opening.

5. Each assembly unit shall be a portable type with two fixed and two locking swivel casters to secure the unit when in operation.

6. Fan shall be installed downstream from the HEPA filter.

7. For nuclear applications, the unit shall be a bag-in/bag-out type for the pre-filters and HEPA filters for outdoor use.

D. Centrifugal Fan:

1. Minimum Performance for asbestos and lead abatement:
   a. The actual air flow shall be 1800 cfm @ 1.5" wg minimum with all filters installed.
   b. The fan motor shall be a 1.5 hp; 120 volts, 15 amp, single phase, 60 Hz, multi-speed, high efficiency, standard "plug-in" (grounded plug) unit.
   c. The fan motor shall have a 100% continuous duty cycle rating with thermal overload protection.

2. Minimum Performance for nuclear applications:
   a. The actual air flow shall be 1000 cfm up to 6" wg minimum with all filters installed.
   b. The fan motor shall be a 1.5 hp; 440 volts, 15 amp, single phase, 60 Hz, multi-speed, high efficiency, standard "plug-in" (grounded plug) unit.
   c. The fan motor shall have a 100% continuous duty cycle rating with thermal overload protection.

E. Control Panel:

1. A direct reading dial type Magnehelic, Photohelic, or Minihelic (for asbestos abatement only) differential pressure gauge with a range of 0 to 5 inches wg, in a weatherproof housing, shall be piped to read differential pressure across the HEPA and prefilters, factory mounted and located on the control panel and shall have an easily accessible front to rear recalibration adjustment.
2. Each air cleaning device will be equipped with a "power on" indicator light, high and low (for nuclear applications only) differential pressure alarm indicator light, and audible alarms.
3. The unit shall have a running time meter with a range of 10,000 hours to monitor service use.

F. Other Requirements

For lead abatement and nuclear applications, any air cleaning device used for local ventilation shall have the appropriate size flexible duct for the required transport velocity, attachable hood, spark arrestor, and hood positioning device as manufactured for unit.

2.04 ACCESSORIES

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2.05 FABRICATION

See paragraph 2.03 Materials.

2.06 LABELING

1. Each air cleaning device shall be permanently labeled with the manufacturer's name and serial/model number on the housing.

PART III EXECUTION

3.01 EXAMINATION

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3.02 PREPARATION

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3.03 ERECTION/INSTALLATION/APPLICATION

A. Subcontractor's Responsibility

1. Air Filtration Devices shall be used only for ventilation tasks approved by radiological protection and/or industrial hygiene for which a Radiation Work Permit, Asbestos Permit or Chemical Hazardous Material Work Permit has been prepared. These work permits will specify any precautions or limitations on the use of the Air Filtration Devices.

2. The efficiency and effectiveness of the Air Filtration Devices to operate within design specified criteria in relationship to containment integrity shall be the responsibility of the subcontractor.

3. The subcontractor shall determine and provide all services and consumables, (except DOP testing) pre-filters, exhaust ducts, differential pressure gauges and accessories needed to operate to such requirements.

4. When there is no longer a need for an Air Filtration Device, the subcontractor shall turn-over the HEPA unit to Fluor Daniel-Fernald in good operating condition, except for normal wear and tear including painting, cleaning, and lubrication. The subcontractor shall inspect and document Air Filtration Device operations per requirements of the Manufacturer's Operating and Maintenance instructions and subcontract provisions.

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B. Fluor Daniel-Fernald Responsibilities

1. Fluor Daniel-Fernald shall provide a filter integrity test (DOP test) following installation of a HEPA filter to ensure that the filter is in good condition and is properly installed. The filter integrity test shall be repeated anytime the Air Filtration Device is opened, or dropped when the HEPA seal is broken, and at least every six (6) months. A tag or label showing the date that a filter integrity test has been performed and the date the test expires shall be affixed to the Air Filtration Device and shall not be removed by the subcontractor. Any Air Filtration Device found with seals broken or other evidence of tampering shall be removed from service until it has been reinspected and DOP tested by Fluor Daniel-Fernald to ensure proper installation of the pre-filter and HEPA filter. The subcontractor shall provide a one week notice for a new HEPA filter and DOP test services.

2. Fluor Daniel-Fernald will provide any subsequent HEPA filters and DOP testing, not pre-filters, that the subcontractor may need on a cost recovery basis for the filter.

3.04 Quality Control

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